

# M o n t h l y M a r i n e B i o t o x i n R e p o r t

October 2010

Technical Report No. 10-17

## INTRODUCTION:

This report provides a summary of biotoxin activity for the month of October, 2010. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

## Southern California Summary:

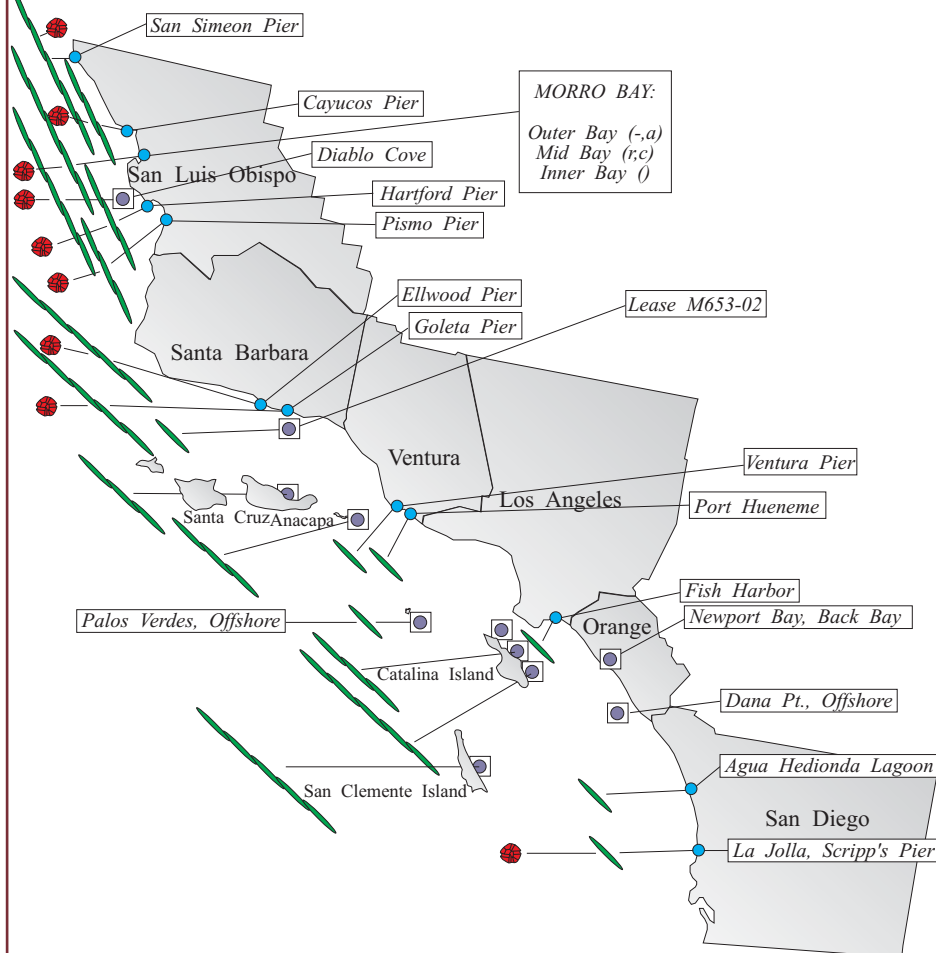
### Paralytic Shellfish Poisoning

Low numbers of *Alexandrium* were detected at sites between San Luis Obispo and Santa Barbara counties and at one location in San Diego County (Figure 1).

Low levels of PSP toxins were detected in

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Figure 1. Distribution of toxin-producing phytoplankton in Southern California during October, 2010.



## Relative Abundance of Known Toxin Producers

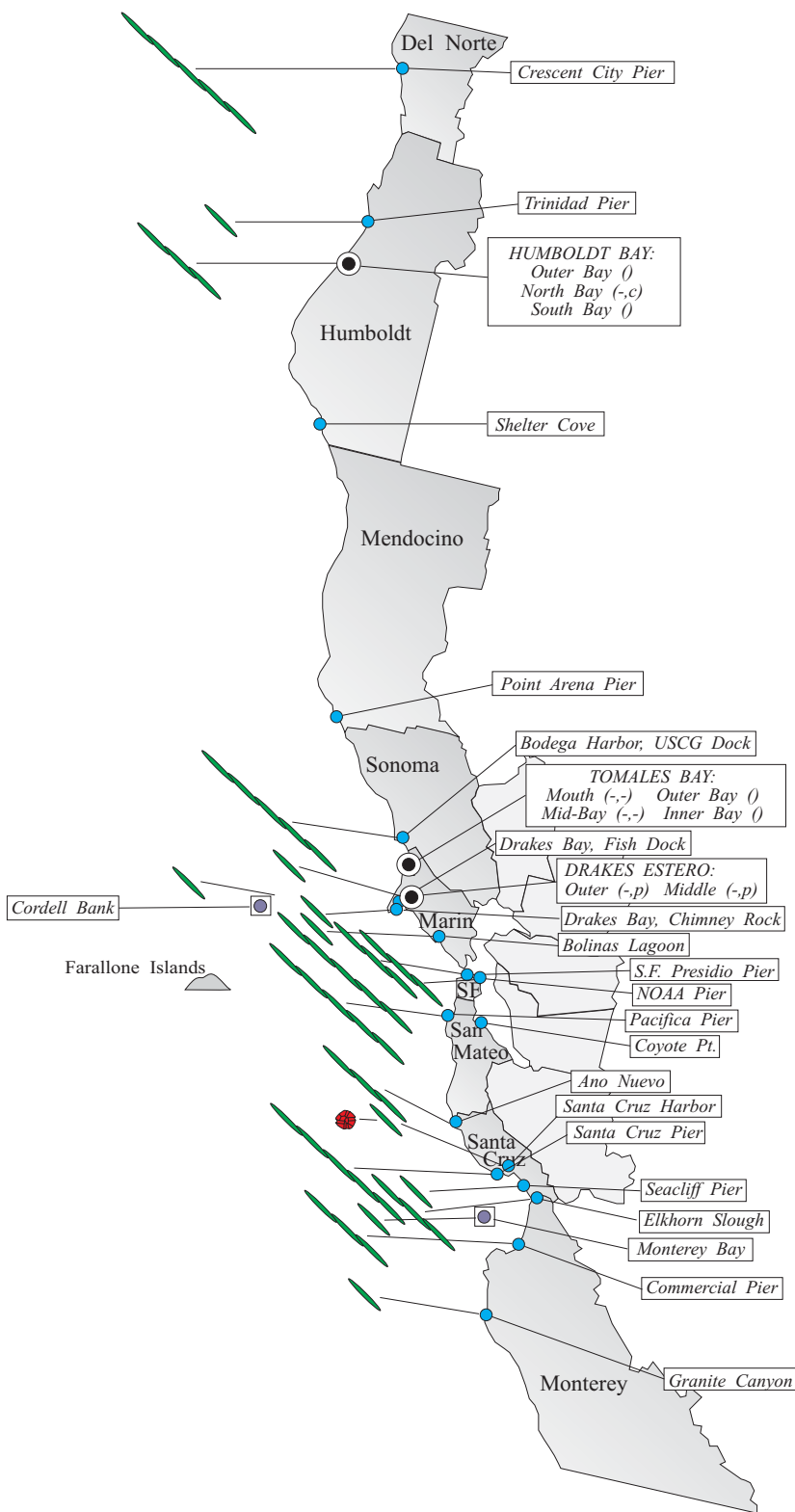
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (less than 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

## MONTHLY SAMPLING STATIONS:

- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

For areas with multiple sampling stations, species abundance at each station is represented as follows:  
(a,p) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.  
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 2. Distribution of toxin-producing phytoplankton in Northern California during October, 2010.



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shellfish samples from Santa Barbara and Ventura counties and in one sample of lobster viscera from Anacapa Island (Figure 3).

### Domoic Acid

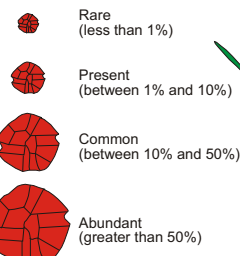
*Pseudo-nitzschia* was observed along the entire southern California coast during October (Figure 1). There was an increase in the relative abundance of the *delicatissima* complex of *Pseudo-nitzschia* species that are thought to be nontoxic. The highest relative abundances of *Pseudo-nitzschia* were observed in outer Morro Bay (October 29), offshore of Diablo Cove (October 8 and 28) and at the San Simeon Pier (October 1).

Domoic acid was not detected in any shellfish samples collected along the southern California coast in October (Figure 3), perhaps reflecting the increased prominence of the nontoxic *delicatissima* complex of *Pseudo-nitzschia*. There were moderate to high concentrations of domoic acid detected in samples of lobster viscera from the northern Channel Island chain. Elevated levels of this toxin were detected in lobster viscera from each of the islands (San Miguel, Santa Rosa, Santa Cruz, and Anacapa). The highest concentration detected was 1170 ppm in lobster viscera from Anacapa Island (October 11). A meat sample from the same lobster did not contain domoic acid. Toxicity

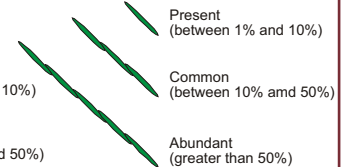
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### Relative Abundance of Known Toxin Producers

#### Alexandrium Species



#### Pseudo-nitzschia Species



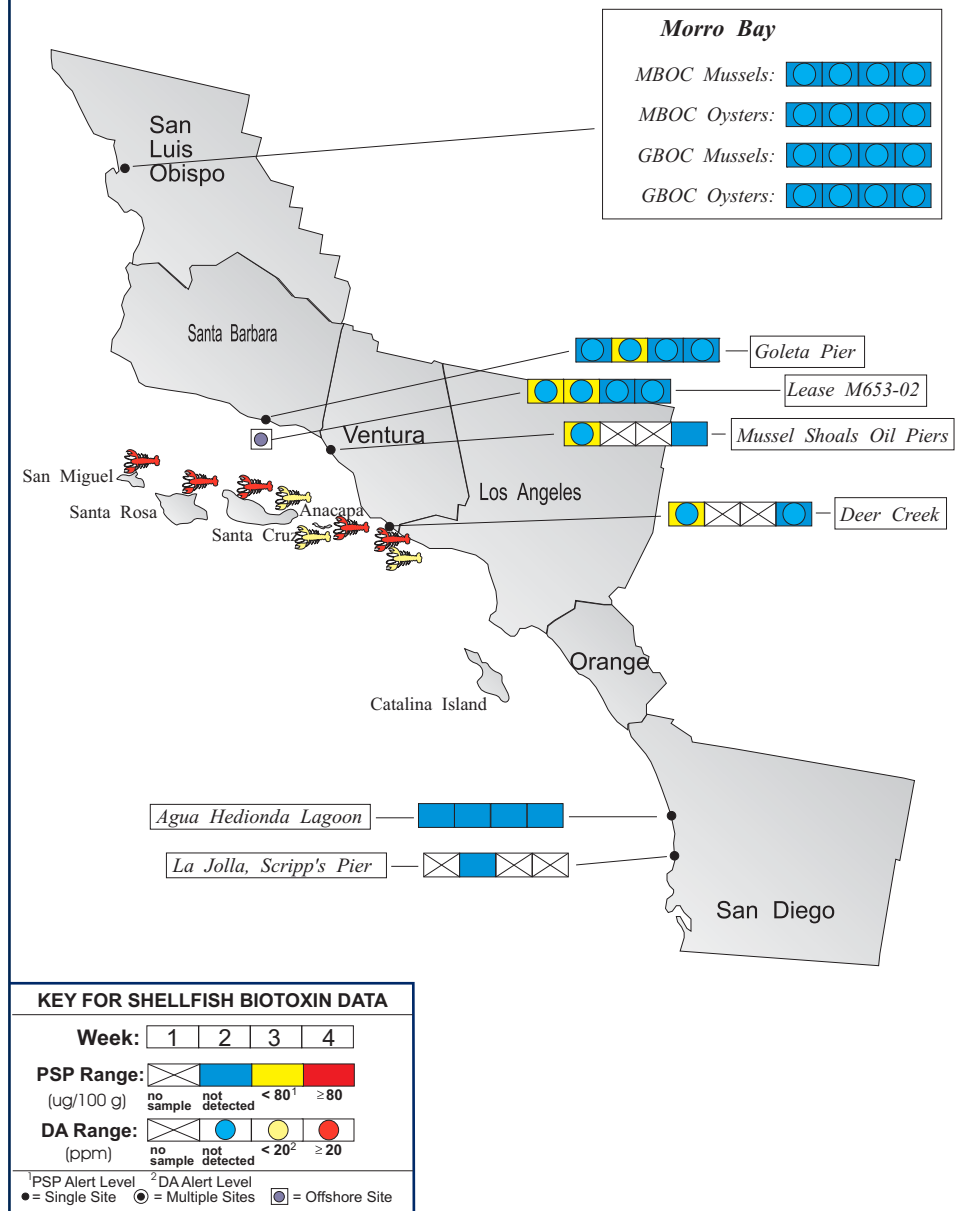
#### MONTHLY SAMPLING STATIONS:

- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

For areas with multiple sampling stations, species abundance at each station is represented as follows:

(A,P) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.  
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 3. Distribution of shellfish biotoxins in Southern California during October, 2010.



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persisted in the lobster viscera samples throughout the month. Advisories were issued by both the California Department of Public Health (CDPH) and the Department of Fish and Game (DFG; see the 'Quarantines' section below). CDPH would like to acknowledge our volunteers and the DFG biologists in the region who increased their sampling activities significantly to help us determine the magnitude of this event.

### Non-toxic Species

A mix of diatoms (*Chaetoceros*) and dinoflagellates (*Prorocentrum*, *Ceratium*, and *Lingulodinium*) was observed at sites between Santa Barbara and Orange counties.

### Northern California Summary:

#### Paralytic Shellfish Poisoning

*Alexandrium* was observed at only one sampling site during October (Figure 2). PSP toxins were not detected in any shellfish samples (Figure 4).

#### Domoic Acid

*Pseudo-nitzschia* was observed at most sampling locations along the northern California coast during October (Figure 2). The highest relative abundances of *Pseudo-nitzschia* were observed at Santa Cruz Pier (October 6), the entrance to

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The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Public Health, is a state-wide effort involving a consortium of volunteer participants. The shellfish sampling and analysis element of this program is intended to provide an early warning of shellfish toxicity by routinely assessing coastal resources for the presence of paralytic shellfish poisoning (PSP) toxins and domoic acid.

The Phytoplankton Monitoring Program is a state-wide effort designed to detect toxin producing species of phytoplankton in ocean water before they impact the public. The phytoplankton monitoring and observation effort can provide an advanced warning of a potential toxic bloom, allowing us to focus sampling efforts in the affected area before California's valuable shellfish resources or the public health is threatened.

For More Information Please Call:  
(510) 412-4635

For Recorded Biotoxin Information Call:  
(800) 553-4133

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Elkhorn Slough (October 2), and at Pacifica Pier (October 25).

Domoic acid was not detected in any shellfish samples analyzed during the month (Figure 4).

### Non-toxic Species

Diatoms continued to dominate the phytoplankton assemblage between Del Norte and Sonoma counties. *Chaetoceros* and *Skeletonema* were the most common genera observed. The dinoflagellates *Prorocentrum* and *Gonyaulax spinifera* were common between Marin and Monterey.



### QUARANTINES:

A health advisory was issued on October 16 warning consumers not to eat sport-harvested shellfish or the internal organs of crustaceans and small finfish from the Channel Islands. Elevated levels of domoic acid were first detected in the viscera of lobster in this region and subsequently in rock crab viscera. This toxin was not detected in meat samples from lobster or crab. DFG issued a press release on October 29 warning all consumers to eat only the tail meat of California spiny lobster and only the meat of crab until further notice. All internal organs, including the roe, should be discarded.

The annual mussel quarantine, which went into effect on May 1, ended on schedule at midnight October 31 with the exception of the health advisory issued for the Channel Islands. When in effect, this quarantine prohibits the sport-harvesting of mussels along the entire California coastline, including all bays and estuaries. The annual quarantine

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Figure 4. Distribution of shellfish biotoxins in Northern California during October, 2010.

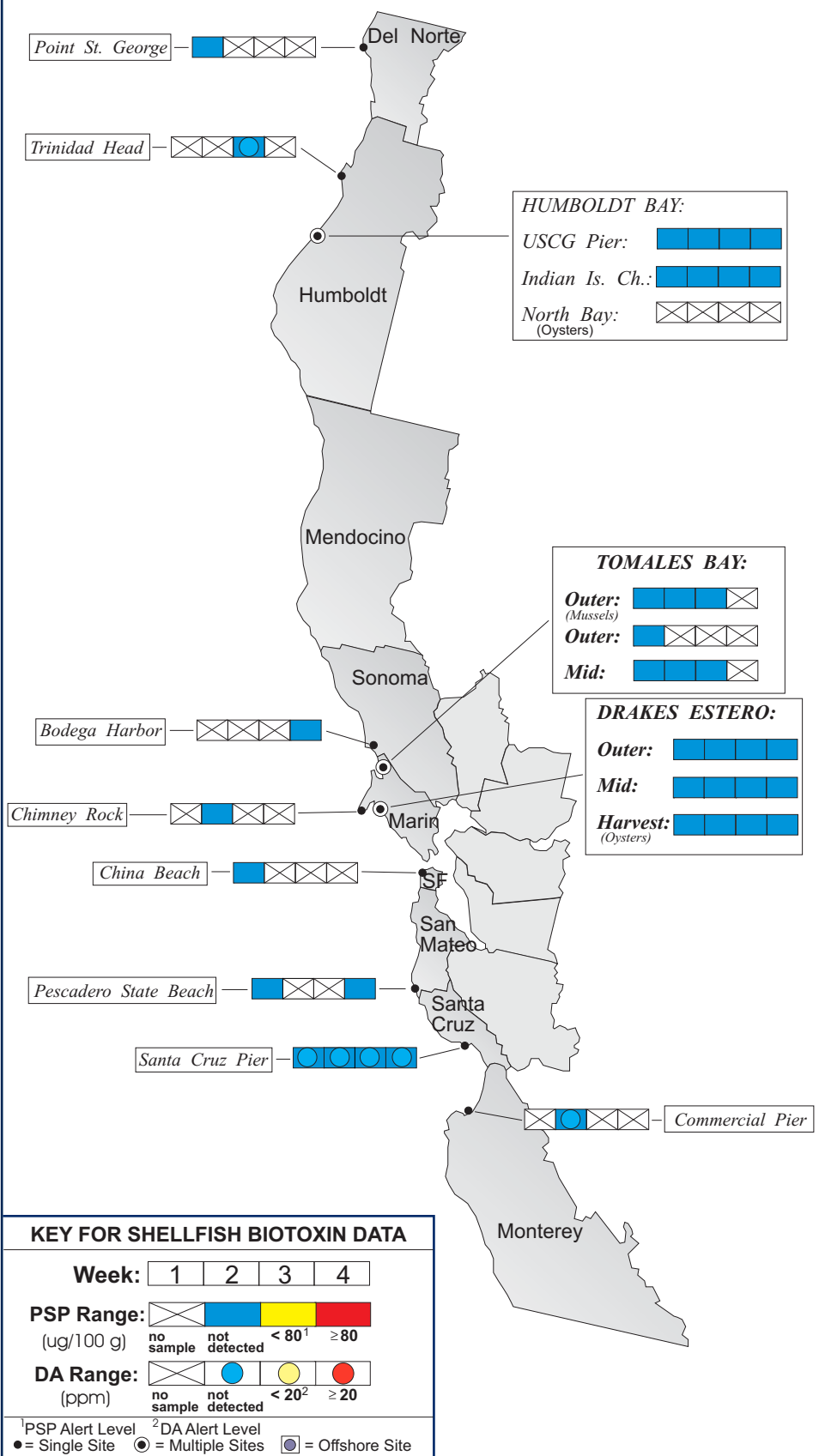


Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during October, 2010.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	1
Humboldt	Coast Seafood Company	7
	Humboldt County Environmental Health Department	1
Mendocino	None Submitted	
Sonoma	CDPH Marine Biotoxin Monitoring Program	1
Marin	Cove Mussel Company	3
	Drakes Bay Oyster Company	16
	Hog Island Oyster Company	3
	Marin Oyster Company	1
	CDPH Marine Biotoxin Monitoring Program	1
San Francisco	San Francisco County Health Department	1
San Mateo	San Mateo County Environmental Health Department	2
Santa Cruz	U.C. Santa Cruz	4
Monterey	Monterey Abalone Company	1
San Luis Obispo	Grassy Bar Oyster Co.	8
	Morro Bay Oyster Company	8
Santa Barbara	Santa Barbara Mariculture Company	12
	U.C. Santa Barbara	4
Ventura	Ventura County Environmental Health Department	4
	CDPH Volunteer ( <i>Bill Weinerth</i> )	2
Los Angeles	None Submitted	
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	4
	Scripps Institute of Oceanography	1

remove and discard the dark parts (i.e., the digestive organs or viscera). Razor clams (*Siliqua patula*) are an exception to this general guidance due to their ability to concentrate and retain domoic acid in the edible white meat as well as in the viscera.

PSP toxins affect the human central nervous system, producing a tingling around the mouth and fingertips within a few minutes to a few hours after eating toxic shellfish. These symptoms typically are followed by disturbed balance, lack of muscular coordination, slurred speech and difficulty swallowing. In severe poisonings, complete muscular paralysis and death from asphyxiation can occur.

Symptoms of domoic acid poisoning can occur within 30 minutes to 24 hours after eating toxic seafood. In mild cases, symptoms of exposure to this nerve toxin may include vomiting, diarrhea, abdominal cramps, headache and dizziness. These symptoms disappear completely within several days. In severe cases, the victim may experience excessive bronchial secretions, difficulty breathing, confusion, disorientation, cardiovascular instability, seizures, permanent loss of short-term memory, coma and death.

Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. These toxins may also accumulate in the viscera of other seafood species such as crab, lobster, and small finfish like sardines and anchovies, therefore these tissues should not be consumed. Sport harvesters are encouraged to contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.

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does not apply to the certified commercial shellfish growing areas in California, which are monitored intensively throughout the year. All certified shellfish growers are required to submit at least weekly samples of shellfish for toxin monitoring. Harvest restrictions or closures are implemented as needed to protect the public's health. In addition, routine coastal phytoplankton and biotoxin monitoring is maintained throughout the quarantine period. Special

quarantines or health advisories may be issued for additional seafood species as warranted by increasing toxin levels.

Consumers of Washington clams, also known as butter clams (*Saxidomus nuttalli*), are cautioned to eat only the white meat. Washington clams can concentrate the PSP toxins in the viscera and in the dark parts of the siphon and can remain toxic for a long period of time. Persons taking scallops or clams, with the exception of razor clams, are advised to



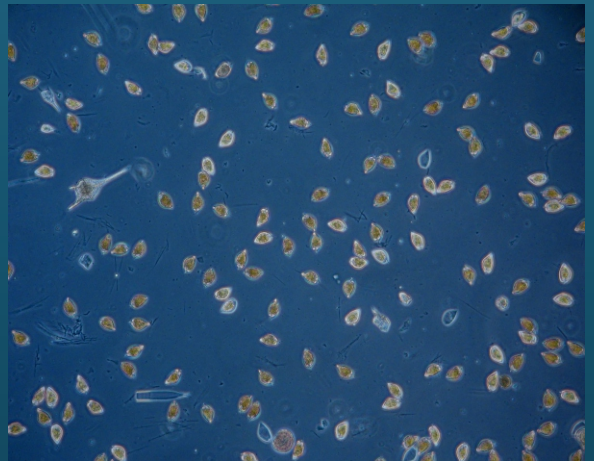
Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during October, 2010.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	3
Humboldt	Coast Seafood Company	4
	Humboldt State University Marine Lab	1
	Bureau of Land Management	1
Mendocino	CDPH Volunteer ( <i>Marie De Santis</i> )	3
Sonoma	CDPH Marine Biotoxin Program	1
Marin	CDPH Volunteer ( <i>B. Anderson, C. Strobel</i> )	6
	Applied California Current Ecosystem Studies	7
	Drakes Bay Oyster Company	11
	CDPH Marine Biotoxin Program	1
San Francisco	Applied California Current Ecosystem Studies	5
	CDPH Volunteer ( <i>Eugenia McNaughton</i> )	1
	San Francisco Health Department	4
San Mateo	The Marine Mammal Center ( <i>Stan Jensen</i> )	4
	Friends of the Sea Otter ( <i>Diane Larsen</i> )	1
	San Mateo County Environmental Health Dept.	1
	U.C. Santa Cruz	1
Santa Cruz	San Lorenzo Valley High School	2
	The Marine Mammal Center ( <i>Nancy Scarborough</i> )	1
	U.C. Santa Cruz	4
Monterey	Monterey Abalone Company	2
	Marine Life Studies	3
	Marine Pollution Studies Laboratory	1
San Luis Obispo	Morro Bay National Estuary Program	1
	Friends of the Sea Otter ( <i>Kelly Cherry</i> )	3
	Monterey Bay National Marine Sanctuary	5
	Morro Bay Oyster Company	2
	Tenera Environmental	3
	The Marine Mammal Center ( <i>Tim Lytsell, P.J. Webb</i> )	7
	CDPH Marine Biotoxin Program	1
Santa Barbara	CDPH Volunteer ( <i>Sylvia Short</i> )	2
	Santa Barbara Mariculture Company	5
	U.C. Santa Barbara	4
Ventura	CDPH Volunteer ( <i>Fred Burgess</i> )	3
	Channel Islands National Marine Sanctuary	1
	National Park Service	2
	Ventura County Environmental Health Department	2
Los Angeles	Los Angeles County Sanitation District	3
	Catalina Island Marine Institute	1
	Tole Mour ( <i>Manhattan Middle School, Valley Oaks</i> )	6
	Southern California Marine Institute	1
Orange	California Department of Fish and Game	6
	Ocean Institute	2
San Diego	Carlsbad Aquafarms, Inc.	4
	Scripps Institute of Oceanography	4

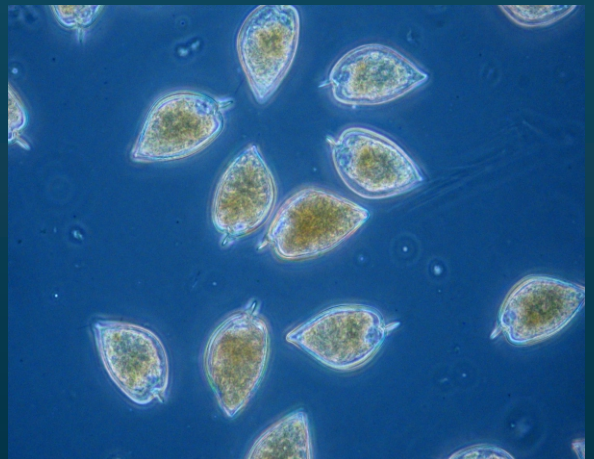
## PHYTOPLANKTON GALLERY



Diatoms like *Skeletonema* and *Pseudo-nitzschia* were common along parts of the California coast.



A bloom of the dinoflagellate *Prorocentrum* was observed inside Monterey Bay.



The dinoflagellate *Prorocentrum* has a distinctive leaf shape, making it one of the easier genera to identify.